

Comprehensive and Strategic Plans for Public Transportation

Emerging Issues Briefing Paper

This is a collection of papers discussing climate change, healthy communities, transportation system pricing and mitigation of major construction projects – issues that may shape the roles public transportation will play in the coming decades. Metro Transit service can be an important factor in reducing auto use, and Metro can take steps to reduce the carbon footprint from its own operations and facilities. If transportation pricing and/or rising gasoline prices reduce auto use, transit demand will increase and more service will be needed. It is also possible that highway construction will itself present a mobility challenge over the coming decade, and if transit can provide a competitive alternative to being stuck in construction-related traffic, new riders may choose to keep using transit once construction is complete.

All of these issues suggest that transit could play an expanded role in the future transportation network and that Metro should plan for a future where transit service may expand more rapidly than is projected by its current financial plan. To expand more rapidly may require investment in needed infrastructure such as operating bases, which require a long lead time to procure. Given limited resources, Metro will need to use every dollar most effectively, and be prepared to accept and prioritize new revenues that could be directed to improved transit service.

What's inside:

1. Climate Change and Healthy Communities.....	3
2. Transportation System Pricing	15
3. Transit and Construction Mitigation: Surviving and Thriving During Highway Construction..	22
4. Responding to Emerging Issues: Planning for Potential System Expansion.....	29
5. Potential Changes to Policies or Strategies (on yellow paper).....	33
Bibliography.....	40

Summary of recommended policy and strategy changes

- **Strengthen policy on environmental protection.** The comprehensive plan already includes policy language directing Metro to minimize detrimental effects on the environment. The proposed policy is more specific, adding a focus on greenhouse gas emissions, and calling for promising technologies to be advanced through demonstration projects.
- **New strategy to consider expansion and enhancement of the electric trolley bus system.** Metro operates a zero-emission fleet of electric trolley buses today. Expanding this system to routes currently using diesel buses would directly reduce carbon emissions from operations on high-volume services. This strategy also calls for evaluating the costs and benefits of electric trolley buses against other state-of-the-art green vehicle technologies, and exploring opportunities to upgrade existing electric trolley services.
- **Expand partnership policy language to pursue new and sustainable revenues for transit.** The existing policy guidance on partnerships is broad. This minor edit proposes that partnerships are also a means to expand service.
- **Revise partnership strategy** to clarify Metro's interest in pursuing new services funded by non-Metro-generated revenues. The existing partnership strategy addresses only the *Transit Now* partnership program and partnerships with employers and jurisdictions to provide incentives for public transportation use. The emerging issues discussed in this paper suggest that Metro should pursue other partnership opportunities as well.
- **Revise prioritization strategy to also address new potential revenues.** The current prioritization strategy does not address service beyond what is provided for in the current financial plan. The proposed edits below are intended to allow for new initiatives, and to prioritize between them if capacity or resources are constrained.
- **Develop a new implementation strategy to develop contingency plans for system expansion.** This proposed strategy calls on Metro Transit to advance financial planning and project development for system elements that pose critical constraints to system expansion if service expansion is to occur more rapidly than assumed in the current financial plan.
- **New policy supporting pricing,** and clarifying position that a portion of revenues should be reserved for transit.
- **Revise strategy on transit and land use.** Existing language also calls for Metro to enhance transit in response to transit-supportive policies and development patterns, but this strategy has been difficult to apply. The revised language is intended to reduce the expectation that transit service can be distributed as a reward on a case-by-case basis, and to instead propose that Metro service planning should focus on serving transit-supportive land uses.
- **Develop new strategy to mitigate freeway construction impacts.** Transit can play an important role mitigating the impacts of major construction projects as long as several favorable conditions are met. Transit can benefit if riders attracted to mitigation service have a good experience and remain as riders once the construction is ended.

1. Climate Change and Healthy Communities

The consensus among scientists that human beings are causing potentially devastating changes to the global climate presents one of the most critical challenges facing humanity today. Climate scientists at the University of Washington predict average temperatures in the northwest will increase approximately one degree Fahrenheit per decade in the 21st century. Such increases are expected to bring about significant changes to our region such as reduced snow pack and water supply, higher sea level and increased flooding and droughts. The impacts of warming across the planet will be significant, affecting people around the world, changing not just the weather, but also economies and the availability of critical resources. Action now could limit the impact and King County has committed to being an innovative leader in mitigating and adapting to climate change.

Transportation plays a key role in climate change, accounting for one-third of greenhouse gas emissions in the U.S. and more than half the emissions in Washington State. All trends point to a continued rise in transportation emissions, as population and employment increase and land use patterns continue to favor automobile travel to access jobs and other needs of daily life. To reduce emissions will require significant changes in how we live and travel, addressing not just emissions per mile, but also the number of vehicle miles traveled (VMT). To reduce VMT while improving the quality of life, we will need to be able to meet our needs with fewer, shorter auto trips. Transportation alternatives will be needed and our patterns of land development and urban form will need to be more compact. Managing overall transportation demand through market pricing will be another critical element to achieve this goal, which will be discussed further in section II of this paper.

Transit and walking will need to become the modes of choice for more of our travel needs. That means both that land uses need to become less oriented to automobiles, and transit services need to be improved and expanded to become the best alternative for a greater share of trips. The connections between walking and transit must be strengthened because transit extends the range of pedestrian travel while walking increases transit use. This also explains the link between climate change and healthy communities. Rising obesity and related health effects are directly related to our automobile dependence and inactive lifestyle. Combating climate change and reducing obesity both call for the same prescription - a more active, pedestrian-oriented lifestyle where more of our travel needs are met locally, on foot, on bicycles and by transit.

To meet the challenge of reducing the impacts of climate change and improving public health, transit will need to be improved and expanded. More investment will be needed, but with constrained resources, every dollar will need to be used most effectively. Transit will also need to examine the carbon emissions resulting from our own operations, and take steps to reduce them. The ambitious goals for climate change adopted by the county will require us to take risks and to question the constraints that limit expectations for transit today. This section will discuss transit's role and objectives in meeting climate change and public health challenges, actions that could be taken, and policy and strategy changes that may be needed to succeed.

The Climate Change Challenge

Scientists have confirmed that the earth is warming and that greenhouse gas emissions primarily due to human activity are the cause. Greenhouse gases, such as carbon dioxide, are largely a product of burning fossil fuels – in cars, power plants and other human activities such as industry. Greenhouse gases also occur naturally in the environment but their accumulation in the atmosphere can be traced to the beginning of the Industrial Revolution. Since roughly 1750, CO₂ levels have risen by approximately 30 percent. This build-up of greenhouse gases is trapping increased levels of the sun's heat near the earth's surface, thereby causing the earth's temperature to rise. If unabated, the increase in greenhouse gases could warm the climate by as much as 10 degrees by 2100 bringing about potentially significant consequences such as the melting of polar ice, the rising of sea level, increased storm intensity and reduced water supply¹.

Effects of climate change are already evident but many scientists believe that taking action now can limit the impacts. To avoid the worst effects, scientists call for reducing emissions by 60-80 percent by 2050 in order to stabilize greenhouse gas concentrations in the atmosphere.

The Public Health Challenge

Global warming is closely tied to transportation and our dependence upon automobiles but a growing body of research is also making the connection between transportation, public health and air quality. Physical inactivity, another result of our increasing dependence on the automobile and our disperse development patterns has been closely associated with dramatic increases in obesity and associated diseases. In King County, 54 percent of the population was overweight or obese in 2004, with obesity levels more than doubling from 1987 to 2004. A 2005 study sponsored by King County showed that walkable communities – those that are compact with mixed uses and well-connected streets – are associated with higher overall rates of physical activity, lower obesity rates and lower per capita CO₂ emissions². The findings suggest that improving public health can be accomplished largely by reducing the amount people drive, by providing travel alternatives such as transit and by making activities such as walking and biking a more integral form of transportation – strategies that also help reduce greenhouse gas emissions.

King County's Aggressive Climate Change and Public Health Goals

King County is taking actions to address both climate change and public health. In terms of climate change, King County along with other governments in the region such as the City of Seattle and the State of Washington have committed to attaining the Kyoto target of reducing emissions. Achieving the Kyoto Protocol target for King County translates to a commitment to reduce greenhouse gas emissions by 7 per cent below 1990 levels by 2012. This will require some major changes considering that the current trend line points to a continued rise in emissions as population, employment, and driving continue to increase.

¹ PEW Center on Global Climate Change, "Climate Change 101", 2006.

² Lawrence Frank & Co., "LUTAQH: A Study of Land Use, Transportation, Air Quality and Health in King County, WA", December 2005.

As an important step in accomplishing this target and the longer term goal of reducing emissions by 80 percent below current levels by 2050, King County developed the **2007 Climate Plan**.³ The plan provides an overview of how King County seeks to reduce greenhouse gas emissions in all sectors and identifies steps to anticipate and adapt to projected climate change impacts. It addresses not only how King County can change its own operations and practices but how it can use its influence as a regional leader to encourage reduced emissions on all levels of government. From a transportation perspective, the plan calls for cleaner cars and fewer cars as well as a continued commitment to encourage alternative modes of transportation, to promote and provide improved public transportation services and to promote commute trip reduction, and increased ridesharing and carpooling. The plan also calls for continued commitment to a clean fleet.

The **2007 Energy Plan**, a precursor to the Climate Plan, sets an initial roadmap for King County's future use, generation and conservation of energy. It calls for transit to emphasize energy efficiencies and clean, renewable fuel sources⁴.

King County has also committed to incorporating public health and air quality considerations into transportation and land use actions and is developing tools that local governments can use to plan communities and transportation that will promote public health and reduce greenhouse-gas emissions. The county has also adopted a resolution to promote active transportation.

Taking Action

Taking action toward these goals, King County is working to reduce fossil fuel consumption and to adapt to the inevitable changes climate change will bring:

- At the local and regional level, King County is enacting major energy and resource conservation programs and requiring **consideration of the impact of development proposals on greenhouse gas emissions** under the State Environmental Policy Act⁵.
- The County is also building a green fleet of **hybrid vehicles** and has been recognized nationally for its use of hybrid, electric and clean diesel transit vehicles.
- In collaboration with the Climate Impacts group at the University of Washington, King County has produced a **guidebook for regional governments** on how to adapt to climate change impacts.
- At the national level, King County has joined several large counterparts across the country in partnering with the Sierra Club to form the **Cool Counties Climate Stabilization Initiative**. King County Metro was the first transit agency to join the Chicago Climate Exchange (CCX), a voluntary market in which members commit to reduce greenhouse gas emissions and work actively with other government members to advocate for a United States federal cap on greenhouse gas emissions.

³ King County 2007 Climate Plan

⁴ King County 2007 Energy Plan

⁵ Climate Impacts Group and King County, Preparing for Climate Change: A Guidebook for Local, Regional and State Governments

Metro's Contribution

As the region's largest transit provider, Metro provides a range of mobility options to help people drive less.

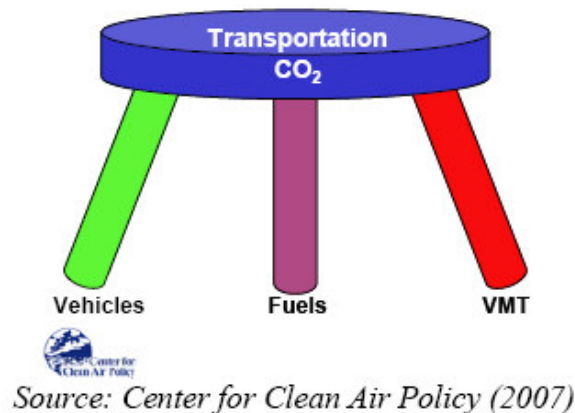
- **Metro transit carried roughly than 115 million riders** in 2007⁶ and will **expand its service by 20 percent** by 2016 through the voter- approved Transit Now program.
- Metro has **the nation's largest public van program**, with more than 2 million riders in 2007.
- Metro also offers ridematch services, marketing programs such as community-based In-Motion, service for people with disabilities and connections for cyclists with bike racks on buses and bike lockers at transit stops; Metro is also a supporting partner in the ZipCar Program (formerly FlexCar).

Reducing greenhouse gas emissions in the transportation sector

As identified above, King County Metro already offers many services and incorporates business practices that help mitigate climate change but will need to do more of it and do so more effectively to achieve King County's emissions targets, particularly in relation to transportation.

The transportation sector's CO₂ emissions are a function of vehicle fuel efficiency, fuel carbon content and vehicles miles traveled, factors often referred to as a "three-legged stool" (Figure 1). Working to reduce transportation-related greenhouse gases requires addressing all three legs.

Figure 1. Transportation CO₂ Emissions: The Three Legged Stool



⁶ Fixed-route Metro-only transit, vanpools and ACCESS

Transit's Role and Objectives for Climate Change and Health

Within the framework of the three-legged stool, the roles Metro and the public transit industry can play in reducing greenhouse gas emissions and making communities healthier are focused in three areas:

1. **Reducing the emissions from our own operations.** While Metro has worked hard to reduce emissions from its vehicles and facilities, it can do more still. Continued commitment to clean fuels and technologies can be complemented by an on-going focus on service efficiency and effectiveness.
2. **Providing alternatives to driving through improved and expanded public transportation.** Buses, vanpools, paratransit, streetcars and ridesharing all provide a means to access jobs and other daily needs without using a car.
3. **Helping make communities more compact, healthy and active.** In both urban and suburban parts of the county, people desire to be able to walk safely and to meet more of their daily needs on foot, bicycle or on transit.

The first area directly addresses the clean fuels and clean vehicle legs of the stool. The second and third areas address the third leg, reducing VMT.

1) Reducing the emissions from our own operations

Clean fuels and vehicles combined with efficient service are key to reducing operations-related emissions. Metro takes its commitment to clean air seriously. Metro's buses are required to meet the emission standards in effect when the bus is built. Heavy-duty diesel engines used in transit buses must meet more stringent EPA standards than diesel engines used in trucks. The EPA raises the emission standards every few years. Buses delivered since 1995 generally have no visible exhaust.

In terms of clean transportation technologies, King County has been recognized nationally for its use of clean vehicle technologies:

- **Clean diesel:** As an additional commitment to clean air, Metro retrofitted particulate traps to the 273 1999-2000 New Flyer articulated diesel buses and the 95 1999-2000 Gillig 30 ft diesel buses. These particulate traps or exhaust filters, along with the ultra low sulfur diesel fuel Metro is now using, will further reduce diesel particulates. The 100 New Flyer 40 ft low floor diesel buses also have particulate traps.
- **Hybrid buses:** Metro has purchased a fleet of hybrid articulated buses to replace the Breda tunnel buses. The hybrid technology, by converting energy normally wasted in braking into electricity and using it to help accelerate the bus, further reduces emissions. The hybrid buses and the 30 New Flyer low floor articulated buses also have particulate traps.

- **Electric trolleybuses:** An additional component of Metro's commitment to the environment is its fleet of zero-emission electric trolley buses. These 146 buses provide clean and quiet public transportation on some of Metro's heaviest routes.

Metro investments also help build new markets for clean technologies. To meet greenhouse gas reduction goals, Metro will need to continue demonstrating and implementing cleaner vehicle technologies for its entire fleet and meet low-emission standards for its facilities.

Metro is also on the cutting edge of fuel technologies. Using a blend of 20 percent biodiesel in all appropriate vehicles, King County is the largest single user of biodiesel in Washington State which makes its fleet cleaner and helps to stimulate in-state biodiesel production.

Reducing VMT through alternatives to driving and compact, transit-supportive communities

While much of the focus to date has been on advances in clean fuels and vehicles, there is growing recognition that the third leg of the stool - reducing VMT - is a critical part of a solution. To make a substantial difference in emission levels will require reducing the region's dependency on driving and eliminating trips altogether. For one, a complete turnover of the nation's fleet to fuel-efficient vehicles could take 20 to 30 years. But the real problem lies in the fact that people are driving more and more. Even stringent clean-air standards would not be sufficient to offset growth in VMT.

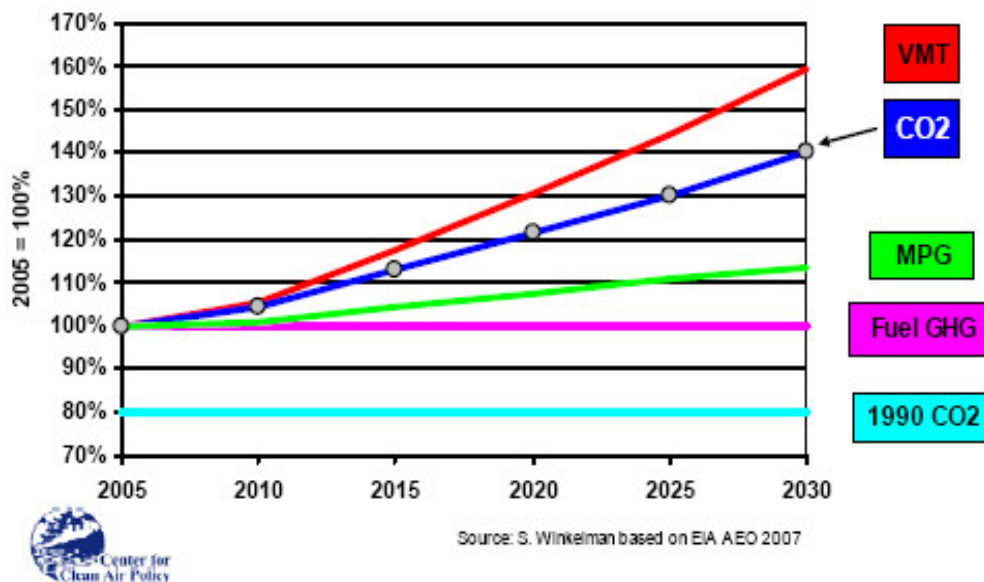
The amount that people drive, measured as vehicle miles traveled (VMT) has been steadily increasing over the past 25 years. The rise in VMT is due in large part to sprawling development patterns that require driving longer distances as well as limited transportation alternatives. Between 1980 and 1992, national urban VMT grew by 60 percent overall, with highway VMT growing by 88 percent.⁷ In King County, the vehicle miles traveled during the same time frame grew faster than the national average, increasing by 78.5 percent. This increase far outpaced the County's population growth of 28.9 percent and employment growth of 39.4 percent. Since then VMT in King County has continued to grow, but is more aligned with population growth.

Growth in VMT is expected to continue. The U.S. Department of Energy's Energy Information Administration (EIA) projects a 59 percent increase in national VMT from 2005 to 2030, outpacing projected population growth of 23 percent, as depicted in Figure 2. Over this time period, vehicle emission rates are projected to improve by 13 percent as more fuel efficient vehicles penetrate the nation's fleet. Under this scenario, CO2 emissions would increase by about 40 percent, or 74 percent above 1990 levels⁸. Consequently, allowing VMT to grow on its projected path will not enable attainment of emission targets for climate stabilization. It is critical to reduce VMTs. Providing transportation alternatives through improved and expanded transportation along with compact, transit-friendly development can help address the problem.

⁷ EIA Residential Transportation Energy Consumption Survey 1994;

⁸ http://www.ccap.org/domestic/Domestic%20Dialogue%20July%2007%20Presentations/CCAP%20Transp%20package%20discussion%20memo%207%2026%2007_.pdf

Figure 2. Projected Growth in CO₂ Emissions from Cars and Light Trucks



2) Providing transportation alternatives through public transportation

As a transportation alternative to automobile use, transit helps reduce emissions by decreasing the amount people drive, providing more fuel-efficient mobility and lessening congestion. People who have competitive transit options drive less. Numerous studies have examined the relationship of eliminated auto trips to transit trips, and the results suggest that on average, approximately 4 auto trips are not taken for every trip on transit.⁹ Households that use transit drive an average of 29 miles per day compared to 45 miles per day for households that do not use transit regularly. Transit use has also been shown to reduce petroleum use by 1.4 billion gallons annually, which translates to 4 million gallons per day.¹⁰

Fewer auto trips means fewer emissions. According to an American Public Transportation Association (APTA) report, transit reduced CO₂ emissions in the United States by an estimated 6.9 million metric tonnes in 2005.¹¹ On an individual basis, a solo commuter who switches to existing public transportation services can reduce his CO₂ emissions by 20 pounds per day, or more than 4,800 pounds per year.

A number of studies suggest that transit's influence on the built environment leads to significant reductions in driving, and consequently fuel use and greenhouse gas emissions. These reductions are attributed to transit's support of higher density land uses and a more efficient built environment, which allow for fewer miles of travel, shorter commute times, reduced road maintenance and reduced need for parking.

⁹ "Transit and VMT Reduction" Travelmatters.org

¹⁰ Bailey, L., "Public Transportation and Petroleum savings in the US: Reducing Dependence on Oil" ICF International

¹¹ Davis, T and Monica Hale., "Public Transportation's Contribution to US Greenhouse Gases", SAIC Study, September 2007

A More Robust Role for Transit

The rising awareness of the threat of global warming and the health implications of an auto-centric lifestyle add urgency to transit's existing mission. The indicators suggest a more robust role for public transportation. Transit can effectively reduce vehicle miles traveled when it is a competitive travel option – the key is making it a competitive travel option for more people on more occasions. Buses, vanpools, paratransit, streetcars and ridesharing all provide a means to access jobs and other daily needs without using a car. To provide more options for more people, Metro's Transit Now program will expand service by 20 percent by 2016.

An expanding role will require new resources

Transit is already attracting more people across the United States, as demonstrated by increasing ridership. Between 1995 and 2006, transit ridership in the US grew by 30 percent, outpacing both growth of highway use at 24 percent and population at 12 percent.¹² This has certainly proven to be the case in King County with Metro's ridership rising steadily over the past few years, showing a 15 percent increase between 2005 and 2007. In contrast, Metro transit revenues grow only with increases in sales tax revenues, with much of the increase consumed by increases in the cost to operate service. Metro service is essentially on a fixed income, while demand and expectations for transit continue to grow. To some extent, Metro can work to optimize its service efficiency by promoting increased use of transit when and where it has trips, such as off-peak times but this has only a limited affect. If ridership increases continue on their current course without additional service investment, system crowding will reach a critical point in only a few years. Further discussion of expanding the system is located in Section 5.

Attention at the state and national level

A recently released state report commissioned by Governor Gregoire, *Leading the Way on Climate Change: The Challenge of Our Time*¹³, identifies transit as an integral part of the efforts to reduce greenhouse gas emissions. The plan includes strategies to promote transit, ridesharing and commuter choice programs and to develop associated funding mechanisms.

On a national level, transit is getting attention in both the U.S. and Canada, attention that may help bring higher levels of investment. In light of the role transit can play, the American Public Transit Association (APTA) is calling for Congress to incorporate public transportation into a national climate strategy that includes providing additional funding for more public transportation investment and tax credits and other incentives to promote commute trip reduction and mixed use development to reduce dependency on driving.

Canada is also calling on transit to play a significant role in its national campaign to address climate change by strongly marketing transit and the Canadian Urban Transit Association (CUTA). The Canadian transit industry is also exploring ways to promote the reduction of greenhouse gases through operational strategies and advanced fuel and vehicle technologies.

¹² APTA presentation: "Public Transportation's Role in a Greenhouse Gas Reduction Strategy"

¹³ Washington Climate Advisory Team, "Leading the Way on Climate Change", January 2008.

3) Helping make communities more compact, healthy and active

Transit's success as a travel alternative is largely dependent upon land use and development patterns. The dispersed land use which has given rise to increased vehicle miles traveled is also closely linked to the diminishing effectiveness of transit, reduced walking and exercise in daily life, and growth in greenhouse gas emissions.

In contrast, compact development – which features a mix of land uses, strong population and employment centers, interconnection of streets and structures at a human scale – reduces the need for auto ownership, reduces driving, supports effective transit service and increases ridership.¹⁴ On a per capita basis, residents of the most compact areas of the region generate 28 percent fewer miles of travel than their suburban counterparts.¹⁵

Residential density, along with a greater mix of land use and closer intersection spacing, has also been associated with lower greenhouse gas production on a per capita basis – greenhouse gases decline steadily as density increases. Consequently, focusing growth in compact urban communities reduces greenhouse gas emissions and increases transit effectiveness while using land more efficiently.

Transit not only benefits from higher density development but can also promote it. Numerous studies have suggested that availability of transit enables more efficient development. Concentrations of transit service can bring larger numbers of pedestrians to a center or business district, so pedestrian-oriented retail uses and building designs are more likely to be attracted. Availability of transit service can also improve the market for higher-density housing development.

More compact communities also foster a healthier lifestyle. Research conducted in support of King County's Healthscape program has shown that in communities that support walking and biking, people are more active and benefit from cleaner air.

Local jurisdiction actions and policies can make transit more competitive

Transit can help reduce greenhouse gas emissions and make our communities healthier but its effectiveness depends largely on the conditions in which it operates. Making transit a feasible and desirable mobility option is easier to do in conjunction with policy and planning measures that promote transit. Transit-supportive land use as mentioned enables transit to be more effective. There are other valuable measures to support transit such as providing workplace incentives for employees, designing transit stations that are accessible by foot and bike, as well as by car and reducing the amount of parking available at major destinations.¹⁶

¹⁴ Ewing, R et al. "Growing Cooler: The Evidence on Urban Development and Climate Change"

¹⁵ Lawrence Frank & Co; LUTAQH Brochure at http://www.metrokc.gov/healthscape/publications/LUTAQH_brochure.pdf

¹⁶ "Transit and VMT Reduction", Travelmatters.org

Metro and other transit agencies are dependent to some extent on other agencies and jurisdictions to create transit-supportive environments. In terms of land use, efforts have been underway in the state and the region to address sprawl and inefficient development of land. In 1990, the State passed the Growth Management Act to focus growth in urban areas. Regional policy set by the Countywide Planning policies encourages growth in centers. King County incorporates smart growth strategies that integrate land use, transportation, public health, environmental management and economic development into all its business.

On a local level, Metro relies on jurisdictions to help create land use patterns, policies and operating conditions that make transit a more competitive option. Existing Metro strategies emphasize the mutual need of transit agencies and jurisdictions to create an environment where transit can succeed, and proposes that new service should be prioritized to reward these policies and actions. This strategy has proven challenging to implement. Metro has followed suit by focusing service delivery in the urban area and placing priority in service supporting centers.

Strategic Plan Issues

Metro Transit's existing policies and strategies are largely in alignment with King County's objectives to mitigate and adapt to climate change, but to meet goals for reducing greenhouse gas emissions, more needs to be done than is identified in the existing strategic plan or planned for under current financial assumptions. Metro must provide transit services that emit even less and carry more people - services that are clean-fueled, reliable, convenient, and efficient. This section will identify areas where new or modified policies or strategies may be needed to meet the challenges posed by climate change goals and the healthy communities initiative. The actual recommended policies and strategies are included in Section 5. Future briefing papers will address related topics focusing on ways to make transit more attractive to increase ridership and to optimize use of its capacity through service quality and marketing, and making transit more efficient and effective by establishing monitoring and management based on guidelines for service and facilities.

What new steps are needed to reduce the carbon impact of transit operation?

Metro is already on the cutting edge in its use of biodiesel and low sulfur fuels and employs a significant hybrid and electric fleet. To continue on the right path, it is important to take full advantage of these clean technologies already in use and to assess how to optimize and possible expand their use. It will also be important to monitor the advances in clean vehicle development and to be prepared to demonstrate and deploy these technologies as they become practical. Investing in new technology can be risky and expensive, but it is important for large fleet owners to take technology risks to help bring promising technology improvements to a wider market.

Response to climate change will need to be dynamic. Strategies that are effective now, may not be in the future. For example, electricity is currently a clean energy for the Puget Sound area but in the future if snow packs diminish in the northwest as expected, water supply will decrease which could impact the availability of clean electricity.

What can be done to maximize efficiency and productivity?

Climate change and an interest in reducing Metro's carbon footprint call for an emphasis on efficiency and productivity. Unfilled buses produce more emissions than they reduce. Efficiency will also be critical as Metro is faced with increasing demand for services with limited resources. Even if new revenues can be developed, expansion of service takes time. To serve demand that increases faster than resources, new steps will be needed to direct existing resources that could be put to more effective use.

Metro's existing strategies promote efficient bus use. Metro monitors bus usage, and makes regular service adjustments to improve productivity – which is the reason that new service changes generally result in productivity that exceeds the system average. Upcoming briefing papers on the operating program, and on guidelines and monitoring, will address the question of whether more can be done to systematically redirect resources to more productive use.

How will transit find new resources needed to play a larger mobility role?

To accommodate the shift from auto use required to meet climate change reduction goals, transit will need to carry a greater share of people. But Metro's system is projected to expand only by 1-2 percent per year, even with Transit Now investments. Ridership growth rates for the past couple years already exceed that growth rate – ridership has grown 15 percent since 2005. Demand is already on the verge of outstripping available transit capacity. In order to meet the additional increase in demand to respond to climate change mitigation and sustain rapid ridership growth, the system will need to grow. And to do that will require new revenues, since fares cover only 20-25 percent of operating costs.

What needs to be done to be prepared to expand service quickly if needed?

To achieve rapid ridership growth will require transit infrastructure and system capacity investments, some of which have a long lead time. An accompanying paper on Expanding the Transit System addresses the question of how to be prepared for opportunities to expand service.

The flip side of this question is how Metro can provide policymakers with a realistic appraisal of our ability to accommodate the ridership growth needed to meet climate change goals so they can set realistic expectations for transit's contribution to a solution. As other agencies and governments identify goals and actions to reduce emissions, there will be high expectations of the role that transit will play, as is the case with both the Washington State and City of Seattle climate plans. Metro will need to show what we can realistically achieve.

What new steps are needed to manage automobile demand?

Metro's strategic plan includes strategies to reduce automobile use, and significant investment of time and resources are directed to implementing the commute trip reduction law and to forming partnerships with employers and jurisdictions to create a more competitive environment for transit, vanpools and ridesharing. Metro offers many customized pass and incentive programs

that are addressed in the existing strategic plan, and will be discussed further in the forthcoming briefing paper on the operating program.

A more aggressive approach will be needed to meet greenhouse gas reduction goals. Transportation is one of the only areas of our economy where market mechanisms are not used fully and effectively to manage consumption of limited resources, and the resulting overuse of roadways manifests as congestion and excessive fuel use and emissions, as well as land use patterns that unduly cater to the automobile. Transportation pricing is key to increasing transit use and meeting greenhouse emission goals, and is discussed further in Section 2 of this paper.

Gas prices have also been increasing and there is continuing concern that gasoline supply will become more constrained over time. Increasing gas prices have been in part responsible for recent ridership increases. “Pay As You Drive” insurance may also have potential to reduce auto demand by associating the cost of insurance more closely to auto use, rather than paying for insurance as a fixed cost.

How can transit foster healthier, more compact communities?

Existing strategies in Metro’s strategic plan aim to promote transit oriented development, and to prioritize investment towards places where transit-supportive development policies and patterns are applied and achieved. Transit oriented development policies and strategies were addressed in the 2007 strategic plan update.

The existing strategy to prioritize transit investment to locations that are more transit supportive has been applied in a general sense, in that Metro’s core and RapidRide corridors have been defined to connect centers that have many of these transit-supportive elements, and also in the sense that new service has been largely focused on places where ridership potential is high. However, there has not been a fund of service hours set aside specifically to apply as an incentive for specific actions by a local jurisdiction. A proposed amendment to this strategy is included in section V of this paper. This will not be an easy issue to address at the site-specific level, but it will be discussed further in the upcoming briefing paper on guidelines and measures.

Probably the most important way to foster healthy communities will be to continue to expand transit in a way that focuses new services in the places where it will be most effectively used. Transit service increases the range of pedestrian travel, helping to make pedestrian travel more attractive and to bring more pedestrians to retail and employment areas. The option discussed above to allow local jurisdictions to raise revenues to fund transit services needed to implement their comprehensive plans would provide a direct link between land use and transportation planning at the local level.

2. Transportation System Pricing

Transportation system pricing is a strategy to improve the efficiency of the transportation system and help reduce greenhouse gas emissions by charging vehicles for using the system. Pricing can be a powerful mechanism for balancing and managing supply and demand. Free use of highways today results in overuse of limited roadway space and overconsumption of auto use, experienced as congestion. Pricing can help manage congestion and raise revenue that in turn can be re-invested in transportation improvements. It can also encourage the shift to other modes such as ridesharing and transit, both by increasing the relative cost savings of those modes and by generating revenue which can potentially be invested in them.¹⁷

Road pricing would be accomplished through tolls, which can be varied by time of day and traffic conditions for different users in order to manage demand on a dynamic basis. Some of the approaches to tolling that have been applied elsewhere include¹⁸:

- **High occupancy toll (HOT) lanes** where single-occupant vehicles can pay to use HOV lanes when there is available capacity
- **Corridor tolling** such as traditional tolls on individual facilities
- **Cordon tolling** where all drivers are charged a toll when entering a designated area, such as a downtown district
- **System-wide congestion pricing** where fees are charged on all freeways and arterials based on actual system use

Pricing Examples From Around the World

System pricing is being successfully implemented in different forms around the world, with the primary objectives to manage congestion, raise revenue and preserve air quality. In many cases, an increase in use of transit and other public transportation services has also accompanied transportation pricing. The following examples demonstrate several of the approaches cited above, where increased transit use was also noted.

- **London:** In London, a £5 (\$8 US) cordon toll has been imposed for driving private vehicles in an eight square mile central area during weekdays as a way to reduce traffic congestion and raise revenues for transport improvements. An automated system checks vehicles entering the charging zone against a database of motorists who have paid the fee. Vehicle traffic speeds have increased and bus transit service has improved, while accidents and air pollution have declined in the city center. Public acceptance has grown and there is now support to expand the program to other parts of London.¹⁹

¹⁷ Evans, John E et al. "Road Value Pricing: Traveler Response to Transportation System Changes" *Transit Cooperative Research Program Report 95, Chapter 14*. Transportation Research Board .2003.

¹⁸An overall pricing strategy can also include parking fees and taxes but that is not addressed in this paper.

¹⁹ Victoria Transport Policy Institute TDM Encyclopedia, "Road Pricing" at <http://www.vtpi.org/tm/tm35.htm>

- **New York/New Jersey:** In the Tri-State area, the Port Authority of New York & New Jersey changed from fixed to variable priced tolls in 2001. The Port Authority analysis found that 7 percent fewer drivers used the agency's bridges and tunnels during the morning peak hour period and that 4% fewer were traveling the crossings during the afternoon peak hours. The shift of traffic out of the peak hours was accompanied by an increase in off-peak travel, as well as by increased car-pooling and transit use.
- **Stockholm, Sweden:** The city of Stockholm, Sweden, established a charge in 2006 for vehicles entering the inner city area on weekdays between 6:30 a.m. and 6:30 p.m. The charges range from the equivalent of US \$1.27 to \$2.54 per trip, with a maximum daily charge of \$8.00. The program reduced traffic volumes by about 25 percent, removing 100,000 vehicles from the roads during peak business hours and increasing public transit ridership by 40,000 users per day. About 350,000 vehicles per day pay the fee, generating roughly \$500,000 to \$2.7 million in daily revenue, not counting revenue from the \$77 fee charged to those who forget to pay the tax. Retail sales in central Stockholm shops increased compared with the same month in 2005, including significant increases in grocery sales in central neighborhoods, which probably reflects increased purchases by area residents who are more likely to shop locally rather than drive to shop.
- **San Diego's I-15 "FasTrak" Express Lanes:** The I-15 project is making better use of the existing capacity while maintaining free-flow traffic conditions on the HOV lanes through pricing and the use of dynamic pricing. It also generates \$1.2 million in annual revenues, about one-half of which is used to support transit service in the corridor.²⁰

Similarities between tolling approaches

In all of these systems, when faced with a fee, drivers may choose not to travel, or select an alternative time, route or mode of travel if they are unwilling to pay. Drivers who pay are able to drive, when they choose to with reduced congestion. If even a small portion of drivers either choose not to drive or switch modes, it can make a difference – it's been demonstrated that a relatively small shift in the proportion of peak-period trips can lead to substantial reductions in overall congestion.²¹

Short-term trip-making adjustments made by travelers in response to pricing include changes in route choice, time of travel, mode choice, trip frequency and selection of activity and destination. Route choice adjustments predominate when free highway alternatives are available. Long-term effects are less certain; road value pricing may influence not only further decisions about trip-making, but potentially also automobile ownership and location choice for residences, employers, and activities.

²⁰ Evans, John E et al. "Road Value Pricing: Traveler Response to Transportation System Changes" *Transit Cooperative Research Program Report 95, Chapter 14*. Transportation Research Board, 2003, p. 21

²¹ Ibid

Tolling in Washington State

Washington State has applied tolling primarily for large bridge projects, with tolls used to finance construction and borrowing costs. More widespread use of roadway pricing as a congestion management tool has gained wide recognition among local, regional and state leaders in Washington State. King County has been an advocate of tolling as a tool to optimize the efficiency and effective capacity of the transportation system and to help limit greenhouse gas emissions.

Northwest Examples

- **SR 16 Narrows Bridge:** This past year tolls were established on the Tacoma Narrows bridge to finance construction of a second span and addition of HOV lanes. Electronic tolling has been used, and is widely considered successful.
- **SR 167 HOT(High Occupancy Toll) Lanes:** A pilot HOT lanes project is scheduled for implementation in April 2008 on SR 167. The project will convert 9 miles of High Occupancy Vehicle (HOV) lane to HOT lanes between Renton and Auburn. The HOT lanes will provide express trips for transit, vanpools and carpools while allowing solo drivers the option to pay a toll to use the lanes. Toll rates for single-occupant vehicles will vary depending on roadway usage in order to manage traffic and maintain a speed of 45 mph or better. This project will be the first application of HOT lanes in the region and is expected to optimize the balance between traffic flow and HOV speed and reliability. The project should also provide experience in safe and efficient HOT lane design and operation which can be applied to other corridors if system pricing is applied.
- **Urban Partnership Program for SR-520:** Corridor pricing could also be implemented on the SR-520 bridge under the Urban Partnership program, a new federal program that partners the U.S. Department of Transportation (USDOT) with metropolitan areas that commit to the pursuit of aggressive strategies to reduce traffic congestion. Under the Urban Partnership program, the region will apply congestion pricing in the form of tolls, and undertake aggressive transit service improvements, demand management programs, and technological applications in an effort to improve the efficiency of the transportation system.

Urban Partnership Program Status

On August 13, 2007, the USDOT selected the SR 520 Bridge Replacement and HOV Project as a priority project to receive grant funding and additional federal support under the Urban Partnership Program to implement advanced transit, technology, telecommuting, and tolling projects designed to reduce traffic congestion.

Under the Urban Partnership Agreement, the Urban Partner – comprising WSDOT, PSRC, and King County – agrees that all projects outlined in the agreement will be in operation by September 30, 2009. In exchange for these commitments, USDOT intends to allocate \$128 million in Federal grant funding according to the terms of a grant agreement to be negotiated by the Department and the Urban Partner.

Jointly with WSDOT and the Puget Sound Regional Council, King County has submitted a proposal to the United States Department of Transportation to establish congestion pricing on the SR 520 floating bridge as early as 2009. King County Metro Transit and WSDOT anticipate that transit demand will grow significantly in the corridor, as much as 35 percent, if tolls are established. This increased demand will require additional transit trips across the bridge during the peak and off-peak hours. Service improvements identified in *Transit Now* and by Sound Transit will accommodate off-peak demand. New trips not identified in *Transit Now* will be required during the peak. Additionally, enhancements to passenger waiting areas were included in the proposal, including shelter upgrades at the paired bus zones on either end of the bridge, and real time information at bus stops along SR 520.

Increased transit service to accommodate growth is key to the urban partnership proposal. Congestion pricing increases the price of auto travel, inducing some motorists to seek out alternative modes of transportation. Transit has been identified as a key strategy in reducing congestion under this tolling strategy. Without the proposed new service and passenger amenities, the opportunity to convert motorists into transit riders is compromised and the effectiveness of congestion pricing will be reduced.

Legislative status

Washington State legislators have taken up tolling policy in the 2008 session. Specific legislation is required to authorize tolling on any bridge or highway in Washington State. Two recent statutes address tolling, adopted in 2005 and 2002 respectively:

- **RCW 47.031 Approval of Tolls:** No toll may be imposed on new or existing highways or bridges without specific legislative authorization or upon a majority vote of the people within boundaries of the unit of government empowered to impose tolls. This section applies to chapter 47.56 RCW and to any tolls authorized under chapter 47.29 RCW, the transportation innovative partnership act of 2005.
- **RCW 47.56.075 Toll roads, facilities – Legislative authorization or regional or local sponsorship required:** The department shall approve for construction only such toll roads as the legislature specifically authorizes or such toll facilities as are specifically sponsored by a regional transportation investment district, city, town, or county.

Tolling to Achieve Multiple Objectives

Some of the most difficult challenges to implementing tolls are related to system equity and consistency issues that must be addressed for tolling to be acceptable by policymakers and voters. A decade ago the legislature unanimously passed legislation to foster public-private initiatives that would allow private entities to design, construct and operate transportation facilities and collect tolls for compensation. Of six projects selected by the state, only the SR 16 Narrows Bridge project survived. All of the others were defeated primarily because concerns about consistency and equity were not addressed – it was not readily apparent why travelers in one area would need to pay for using roads that are provided for free in other places.

Consistency is an important principle in transportation system design, as can be seen in the consistent use of signs, pavement markings and traffic controls throughout the country that allow travelers to use the road system safely wherever they go. Consistency has also been important in public acceptance of HOV lane policies. The need for consistency presents a challenge to the flexible use of tolling, both for managing demand and financing construction costs. Different roadway improvement projects will have dramatically different costs, and tolls set based on project costs will vary greatly between corridors. From the driver's point of view however, a trip that traverses more than one highway corridor is still a single trip. Balancing system objectives with needs for individual roadways is a key challenge to designing a successful toll program.

Some key principles in implementing a successful pricing program to achieve transportation demand objectives include²²:

- Choosing pricing methods that are cost effective to implement, convenient to users, and accurately reflect the costs imposed by each trip.
- Using time-variable tolls, with higher rates during peak periods and lower rates during off-peak periods, to reduce congestion.
- Applying pricing on existing roads, not just new facilities.
- Encouraging development of travel alternatives, including flextime, ridesharing, transit improvements and bicycle facilities.
- Integrating pricing with other TDM strategies that increase traveler choice and provide additional incentives to use alternative modes in the same area.
- Insuring that road pricing decisions are transparent, built on public participation and trust.
- Addressing equity concerns by insuring that all groups receive benefits, either through rebates or improved travel choices.
- Making prices as predictable as possible.

Transit Implications

The Urban Partnership program has begun to illustrate the opportunities and challenges tolling will pose for transit. Depending on many factors, including the toll rate, tolling on SR 520 is projected to increase transit ridership considerably. To accommodate the growth in demand, the Urban Partnership program calls for additional transit service in the SR 520 corridor, expanding key park-and-ride lots and integrating with Metro RapidRide Service.

²² Victoria Transport Policy Institute TDM Encyclopedia; "Road Pricing" at <http://www.vtpi.org/tdm/tdm35.htm>

However, the grants associated with the Urban Partnership are anticipated to fund fleet expansion and capital improvements only, such as park-and-ride lot expansions, improvement of key bus stops, and installation of real-time information signs. Additional funding needed for service increases will need to come from toll revenues or other new sources. Metro estimates that new Sound Transit and Metro service will cost approximately \$4 million annually. There is no funding available within the existing revenue streams of either agency for this increase.

Legislation will be needed to clarify how tolls will be used, and whether they can be applied to accommodate increases in transit demand that will result from the tolling program. Tolling is expected to result in an additional 1.2 million transit trips over SR 520 each year. Some of the increased transit demand can be accommodated by existing and already planned service expansions and route consolidations but additional capacity will be needed.

Strategies to accommodate increased transit demand on SR 520 due to tolling include improving all-day and peak-period frequency of core routes, implementing new and expanded reverse peak service to better serve dense residential areas on the west side of the lake, and adding midday service. An exact service plan will be developed through a public process, but the preliminary service concept proposes to add approximately 60 additional one-way peak-period trips on Metro and Sound Transit service on four core routes (Route 255, 271, 540, and 545). Additionally, Metro expects to provide nearly 30 additional one-way peak-period trips on existing and new peak-period only routes made possible through the proposed fleet expansion.

Other elements of the Urban Partnership program would fund and implement active traffic management and tolling infrastructure on both SR 520 and I-90 to ensure that the proposed congestion pricing can be implemented within the shortest timeline following the legislative approval. The active traffic management components that will be implemented to support pricing on SR 520 (as well as I-90) include speed harmonization, lane control, queue warning, and junction control. These techniques will be implemented using a series of variable message signs over each lane that can display numerical speed limits and lane control directions (such as green arrows and red Xs). These may be accompanied by additional lane channelization at the freeway junctions to ensure traffic move smoothly from and to the SR 520 corridor.

Tolls on I-90

To increase the effectiveness of system pricing on SR-520 and generate more revenue, tolling I-90 is also being considered. As a segment of the interstate highway system, implementation of tolls on I-90 would require federal approval as well as approval from the Washington State legislature and the State Transportation Commission. It is possible also that central Puget Sound voters would be asked to weigh in.. The Washington State Legislature could provide the tolling authority as early as March 2008. As noted in the Washington State Treasurer's report, tolling I-90 may be needed to raise adequate revenue to fund the SR 520 bridge replacement and to operate the overall translake corridor efficiently. In that report, the Treasurer recommended tolling both facilities no later than July 2011.

By tolling both I-90 and SR 520, WSDOT would increase the feasibility of financing SR 520 improvements, while avoiding the negative impact that SR 520 tolls would otherwise have on I-90 traffic due to diversion. Tolling both bridges would also increase the opportunity and challenge to transit by increasing the diversion of cross-lake trips to transit, and increasing the level of transit service needed to accommodate them.

Strategic Plan Issues

Tolling – supported by aggressive transit and transportation demand management programs, as well as the application of technology – can contribute to the improvement and efficiency of our transportation systems. From a transit perspective, transportation system pricing has potential to improve transit travel times, boost ridership, and generate new revenues that could be applied to expand transit service. At the same time, under a system pricing scenario, transit will be expected to provide mobility for those who cannot afford or choose not to pay a toll. How and to what extent transit can respond to the increased expectations will depend on available resources, which will in part depend on decisions regarding use of toll revenue.

Metro is not directly responsible for implementing tolls. As a regional government and transportation provider however, it can influence decisions that are made as the issue of tolling is discussed in the state and at the legislature. Transit could benefit from transportation system pricing that is designed and implemented with transit in mind, and consequently Metro should advocate for system pricing given the following considerations.

What are Metro’s policy interests in regional tolling decisions?

Metro has a stake in all elements of the transportation pricing issue:

- Transit would benefit from new roadway facilities, such as HOV lanes on SR 520 and transit-supportive roadway features such as direct access HOV ramps. Metro has a stake in having a feasible financing plan to complete them.
- Transit would benefit from use of variable tolls, especially if their application results in improved speed and reliability for transit in HOV lanes or other roadways.
- Transit demand would increase due to tolling, contributing to achieving our comprehensive plan goals.
- Transit will need new revenues to accommodate the increased demands for service that tolling would create, and could benefit from legislation to make a share of toll revenues available for ongoing transit operation.
- Achievement of transit interests requires a tolling program that exempts transit from paying a toll and is equitable and consistent in its application to achieve system objectives and to be defensible to the traveling public.

3. Transit and Construction Mitigation: Surviving and Thriving During Highway Construction

While the Regional Transportation Investment District (RTID) ballot measure failed in 2007, the campaign underscored the magnitude of work that may be needed to replace and upgrade aging freeways, including replacing the Alaskan Way viaduct and the SR 520 floating bridge, expanding I-405 and preserving I-5 through Seattle. Freeway construction projects themselves could present one of the most challenging mobility issues over the next two decades. Under the right circumstances, transit could play a role in mitigating major construction impacts, while drawing new riders that would continue to use transit when construction is complete.

This section describes strategies to mitigate construction traffic impacts with transit service and vanpools within the Central Puget Sound region, as well as conditions needed for transit mitigation to be effective. It discusses the costs, constraints, program sizing considerations, and suggests some generalized strategies that could be applied to mitigate major proposed regional corridor construction project impacts.

Conditions Needed for a Successful Transit Mitigation Program

The success of any transit mitigation effort will depend on meeting these five conditions:

1. **Transit will provide faster and more reliable travel times than driving.** This means that HOV lanes must remain available and be managed to meet the state's HOV speed and reliability standards, or an alternative route must be available that will provide a fast and reliable pathway for transit vehicles
2. **Rider incentives will be provided for using transit.** These include subsidized passes to make transit less expensive, parking management and tolling that makes driving more costly
3. **Transit fleet and operating base capacity will be sufficient** and the rate of planned service growth needs to be achievable
4. **Funding is provided for service and fleet expansion.** This needs to include service hours and vehicles that are needed to compensate for increases costs to operate existing transit services if construction results in longer trip times
5. **Comprehensive strategic and tactical marketing of transit alternatives is provided.** People should be aware of the full range of travel alternatives available to them, including vanpools, carpool formation support and traditional transit.

If these conditions are met, there will be a significant increase in transit demand during the construction period. In many cases this will mean that additional services and fleet will be required to accommodate that additional demand. If construction is not managed to provide a fast and reliable path for transit, existing transit service will be more costly and ridership will suffer. Added mitigation service would be less effective, and the cost of funding mitigation services would increase.

How much mitigation service is appropriate?

There are many different ways to determine the appropriate size of a transit mitigation program. Ideally a transit mitigation program should be sized to meet anticipated demand, assuming an aggressive effort to make transit an attractive alternative to private autos. As noted previously, this can be accomplished by combining priority treatments that give transit an edge in traffic with incentives that give it an edge in price. Individual services should be sized to stay within cost-effectiveness guidelines, and the total program should not exceed transit capacity limits.

The best approach would size service based on an estimate of the likely increase in transit demand, based on the following factors:

- **Severity and frequency of construction-related congestion.** This is different from lost capacity, since the congestion impact of lost capacity is far greater as demand approaches or exceeds capacity. If closures will be frequent or unpredictable, the perceived impact to freeway users will be greater than slow but predictable delays.
- **Strength of the underlying transit market.** The success of a mitigation program will be proportionate to the underlying fit and attractiveness of transit in the corridor.
- **Change in the relative travel time between transit and driving.** Incremental transit ridership will be driven by the combined effect of increased traffic conditions and the travel time transit will be able to achieve in HOV lanes or due to other transit priority measures.
- **Likely effectiveness of freeway tolls, and of other marketing and incentive programs.** Data exists from other transit mitigation programs that can provide a basis to estimate the effectiveness of these programs.
- **Capacity constraints.** There is a limit to the amount of transit that can be added to the existing system within a set time period that the total mitigation program cannot exceed.

A great deal needs to be known about the detailed construction program in a corridor to make this assessment, and if multiple corridors will be under construction at the same time, the information and interagency coordination needed increases. Judgment will be required to determine a reasonable level of transit mitigation to minimize negative economic impacts and maintain mitigation service that is well-used and cost-effective.

Transit needs a fast and reliable path during construction to be an effective mitigation strategy.

A foundation for effective transit mitigation service is the availability of a right-of-way for transit to operate in that is faster and more reliable than conditions faced by general traffic. Transit must provide a tangible travel time and/or reliability benefit over driving, or else drivers will have no reason to use it. For bus service, this means that HOV lanes must be open through the construction period, and they must be managed more effectively than they are today to avoid overuse and congestion. If HOV lanes can't be provided, maintained, and managed, then transit needs to have an alternative route that isn't also clogged with traffic.

If transit is to play an effective role in mitigation, coordination with the roadway agency must begin at an early stage of project development, if not earlier. The ability to maintain transit reliability needs to be a project objective from the outset, since changes to accommodate transit become more difficult as design is further along.

Changes to operating practices may also be needed. Often HOV lanes are the first lanes to be closed when lane reductions are needed or when incidents occur, probably because they have the lowest vehicle volumes. This is especially true during off-peak periods. For transit to play a meaningful mitigation role, these practices will need to be changed so that the HOV lane is not always the first lane closed or blocked.

While the best approach to keep transit moving may vary by corridor, some of the generic methods may include these:

- **Contract requirements and incentives.** Since the construction contractor makes decisions about traffic management through construction sites, WSDOT may have the greatest impact on transit priority through carefully-written contract language that sets expectations for maintaining use of HOV lanes or penalties for closure periods.
- **High occupancy toll (HOT) lanes or 2-person HOV permits.** HOV lane volumes are exceeding capacity in several corridors today, and will not provide the speed and reliability advantages they were designed for during construction without other measures to control their volume. Consideration should be given to changing the peak period HOV definition to 3 persons or more, and allowing a limited number of 2-person carpools to buy a permit to use the lanes during peak periods during the construction period. In the longer run, a HOT lane system may be needed allowing other vehicles to use HOV lanes for a price that is set dynamically, based on congestion.
- **Use of shoulders.** If HOV lanes must be closed, or do not exist, consideration should be given to allowing buses to use freeway shoulders or other construction reroutes that are not available to general traffic. Shoulders may need to be upgraded to provide a 12' lane and full-depth pavement, but this will also be useful for other traffic shifts needed during construction. Shoulder use by buses can also help when buses must make freeway-to-freeway movements at congested interchanges where direct ramps are not available.
- **Incident management procedures.** To manage incidents and clear up incident-related congestion, HOV lanes are often opened to other traffic, or accidents are cleared to the HOV lane to allow other traffic to get by. The unfortunate side effect is that transit is also affected by the incident, and the HOV lane fails when it is needed most. Especially during major construction, it is worth reconsidering incident management practices to find ways to keep HOV lanes operating as a first priority.

Public awareness and rider incentives are needed to make sure people will take maximum advantage of mitigation service.

Another foundation for a successful transit construction mitigation program is a program to market transit service and to provide incentives to maximize transit use. If several construction projects will be underway at once, these measures will be more effective if they are applied consistently rather than as separate programs designed and implemented for each corridor.

Early-onset regional marketing will be essential to the program's success. Region-wide joint marketing will help establish a media environment where specific construction mitigation efforts can be marketed by directly targeting people most impacted by a project, given a general public awareness that alternatives are available throughout the region. Aggressive marketing, combined with service design that is easy to understand, will cause ridership to grow more rapidly, and maximize use of the service provided.

Ridership incentives are also important to promoting use of mitigation services, as well as baseline transit services that already exist in each of the impacted corridors. Based on decades of experience providing commute trip reduction programs and ridesharing services, some demand management measures have emerged that have the greatest impact. These include:

- **Pass distribution and subsidy programs.** Examples include the UPass program offered by the University of Washington and others, and FlexPass programs provided through employers throughout the region. Passes can be used on multiple transit systems, as well as for vanpools. These programs consistently result in significant increases in transit use.
- **Marketing and awareness programs.** Added transit service must be advertised in order to be well-used. A robust public information program will be needed to advise travelers of travel conditions, reroutes and travel alternatives, and this program should include information about transit options and incentive programs. Specific programs should be developed to encourage alternative work hours and telecommuting.
- **Individualized travel assistance.** Programs that provide hands-on personal assistance to identify travel options can be very effective in influencing travel behavior.
- **Ridesharing programs.** Expansion of the ridematch database and other efforts to promote carpool and vanpool formation can provide HOV alternatives for commuters for whom transit service is not as effective.
- **Commute trip reduction outreach.** Increased marketing and outreach to employers affected by the commute trip reduction law would increase employer and employee participation and decrease single-occupant commuting.

Transit Mitigation Service Strategies

Transit service should be designed to meet common-sense principles. Some of the principles that should guide mitigation service design include:

- **Enhancing existing services will be more effective and will have longer lasting benefits.** It takes time to build ridership on any transit route, and to build awareness of the service among potential customers. It is also faster to implement an increase in existing service than initiate a new service, since customer information and driver training materials are already available, facilities are in place, and there are existing customers who can spread the word to others most effectively. Customers gained on these services during the mitigation period are more likely to continue riding transit once the construction period is over than customers of an interim service that is cancelled once freeway construction is ended.
- **Mitigation provides an opportunity to increase the use of existing capacity.** The region has spent considerable sums to develop HOV lanes and high capacity transit, including commuter rail and the light rail system that will open in 2009. If projects can be phased so that construction begins after high-capacity service is in place, transit will be in a better position to play a significant mitigation role. To be successful, feeder bus routes and park-and-ride access must be in place and sufficient to allow potential riders to access the system. Where capacity also exists on the local and express bus system, it can be used more effectively if targeted marketing and incentive programs are implemented.
- **Simple is best.** If interim services are needed, they should be as simple to understand as possible. For example, a frequent service to a centrally-located park and ride lot will be easier to describe in a flyer or 10-second radio segment than a more complicated and customized service.

The cost to provide transit is related primarily to the running time of a transit route, and its productivity is affected by underlying demand, whether the service carries passengers in both directions and whether seats are used more than once during a trip due to passenger turnover along the route. Longer trips with service in one direction only will require more hours and coaches to serve the same number of riders than shorter services that operate in both directions, since for longer trips much of the bus travel time is often spent repositioning rather than carrying passengers. Express services that collect riders along local streets are more expensive to operate than those that originate at a park-and-ride lot due to their longer travel time.

Vanpools are effective for more dispersed origins and destinations

Vanpooling provides one of the most cost-effective and flexible strategies for mitigating the impacts of construction projects. As a rule, vanpool vehicles can be purchased faster than buses and they can be moved from one project to another as demand levels change. Several strategies may increase the demand for vanpooling along construction corridors.

- **Priority:** Vanpools should enjoy the same priority measures that allow speedy travel through construction zones as buses.
- **Fleet Availability:** Anticipating that the demand for vanpools will increase once these major construction projects get underway, additional vanpool vans should be available to meet these demands.
- **Marketing:** People traveling through construction zones should be aware of the full range of travel alternatives available to them, including vanpools.

If the region's providers continue to recover a substantial portion of operating costs from fares, the additional public funding required to expand the region's vanpool programs would be limited to the public operating subsidy and capital costs associated with expanding the program.

Recent Experience Mitigating I-405 and I-5 Construction Impacts

Over the past two years King County Metro has collaborated with WSDOT to mitigate the congestion impacts due to construction in the I-405 corridor. By agreement between the agencies, WSDOT funded additional transit service, which was designed and implemented by Metro. One new route was added between Kenmore and Overlake, and additional service was added to another existing route to provide more capacity and more attractive service as an alternative to driving through the construction area.

To support these services and other public transportation options in the corridor, several marketing and incentive programs were also funded, including among others:

- Vanpool relocation program for up to 18 vanpools
- Bellevue Employer Outreach Program to 1225 employers
- South King County Employer Outreach Program
- 2 Residential Outreach neighborhood incentive programs
- Employee Outreach Program to approximately 2000 service employees
- Vanshare Promotion to form six new vanpool groups
- Bicycle Promotion and installation of 8 bike lockers
- Carpool Promotion campaign

This agreement set a new precedent for use of WSDOT funds for transit service, predicated on its success mitigating the effects of WSDOT's construction activities.

These efforts illustrate both the potential and limitations to using transit as a mitigation measure for roadway construction. The program has drawn new riders to transit, but now that the construction period is coming to an end, either new sustainable revenues need to be identified to make these mitigation services permanent or riders will need to find another travel option. The program was also implemented for a project that had relatively minor traffic impacts, and did not provide a fast alternative path for transit.

Strategic Plan Issues

Transit service to mitigate freeway construction may play an important part in maintaining mobility if construction delay becomes more prevalent. In addition to providing a mobility option when it is most needed, mitigation service can introduce new riders to transit who will continue as riders if their experience is a good one. On the other hand, mitigation service can require short-term use of resources that may be needed for other priorities. If the conditions for success are not present, then mitigation service can be ineffective and a bad experience for riders. The strategic plan should clarify the conditions when mitigation service is appropriate, and the steps needed to provide it when those conditions are met.

Specific strategic plan issues include:

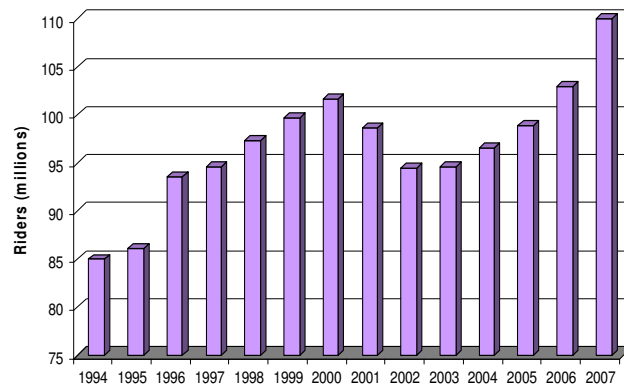
- **When is service mitigation an appropriate strategy?** This paper suggests that mitigation can be an effective strategy if resources can be made available and Metro service will be a competitive option during the construction period. A new strategy for “Construction Mitigation” is proposed in section V of this paper.
- **What are Metro’s priorities for expanded service if resources are not sufficient?** If there are competing demands for service expansion, mitigation service may not be the best use of limited new service resources. When growth potential is limited, priority should go to services that are consistent with the strategic plan, open to the general public, have the highest productivity and the greatest likelihood of being sustainable over time. Proposed changes to the strategy on “Priorities for New Transit Service” included in section V are intended to address this issue.

4. Responding to Emerging Issues: Planning for Potential System Expansion

The collection of papers on emerging issues has posed several scenarios that could call for transit service to expand beyond what is provided for in Metro's current financial plan. Achieving carbon reduction goals will depend on a greater share of travel being met by walking, bicycling and increased transit use. Transportation pricing and variable tolls will support increased transit ridership. Mitigating freeway construction impacts will require more buses and service hours. In addition, some local jurisdictions and regional plans call transit to expand faster than current rates, and proposals to remove the Alaskan Way viaduct without replacing its capacity will require transit to play a larger role in serving downtown Seattle's travel needs.

How will transit find new resources needed to fund new services?

Passage of Transit Now will allow for 2 percent growth annually in service hours until 2016, and a 1 percent growth per year after that. Since 2004 the ridership growth rate has exceeded that rate as shown at the right. To accommodate the growth required to meet climate change reduction goals, this ridership trend must continue or increase – but in that case demand will quickly outstrip available transit capacity. Since fares cover only 20-25 percent of operating costs, new revenues will be needed to sustain rapid ridership growth.



**Figure 3:
Metro Transit**

Metro is authorized to use up to 0.9 cents of King County sales taxes to provide for transit service that is not paid for by fares. This is the maximum rate provided by state law for local transit services. Options for providing new revenues include:

- Petitioning the legislature to raise the maximum rate for transit sales taxes
- Raising fares
- Pursuing revenue options from other agencies and jurisdictions

All of these options have drawbacks and challenges. Asking the legislature for tax authority has limited chance of success, especially with many other critical competing uses that include funding for Sound Transit expansion. Raising fares has the side effect of also reducing ridership gains, counter to climate change objectives. The state made significant contributions to transit prior to passage of Initiative 695 by matching local agency sales taxes with funds from motor vehicle excise taxes (MVET), but these funds were removed by voters. Future general funding from the state for transit seems unlikely for now.

However – there may be opportunities to pursue revenues from other agencies and jurisdictions that would meet mutual interests. Examples of potential opportunities include:

- **Use of roadway tolls.** Instituting variable tolling in the region requires political risk-taking, but has many potential practical advantages. It uses a market approach to managing a limited resource – roadway capacity – to increase roadway throughput while also increasing transit demand and transportation revenues. A portion of tolls could be set aside to pay for the added transit service needed to serve the increased transit demand that tolls would trigger. Transportation pricing and tolling are discussed further in Section 2 of this paper.
- **Mitigation for freeway construction projects.** If current efforts to find funding for major freeway construction projects are successful, construction-related congestion may present one of the more pressing mobility challenges over the coming decades. Transit can play a role in mitigating construction impacts under some circumstances, and resources for mitigation can be funded as part of construction funding. Use of transit for freeway construction mitigation is discussed further in Section 3 of this paper.
- **New revenue sources such as carbon tax.** In the context of climate change, consideration is being given on the state and national level to ways to generate more funding for transit.
- **Concurrency and impact fees.** Suggestions have been put forward to change concurrency and impact fee legislation to charge fees for new development in less accessible locations, and to direct those fees to transit and other multi-modal uses.
- **Achieving higher levels of transit service called for in local comprehensive plans.** Transit demand is higher in some areas than others, and voters in some jurisdictions are more willing to pay for a higher level of service than the baseline level provided countywide. For example, Seattle has adopted a transit plan calling for fifteen-minute all day frequencies on key routes throughout the city, but this level of service cannot be achieved under current revenues, which are further constrained by subarea allocation guidelines. If the Alaskan Way viaduct is removed without replacing its vehicle capacity, transit will need to play an even larger mobility role in Seattle. A win-win solution may be possible if (1) a tax mechanism can be created to allow local jurisdictions to raise transit revenues, and (2) agreement can be found on terms that meet Metro's needs for system integrity and local needs for a measure of control and recognition for locally generated revenues.

The final option above needs to be discussed further in the strategic plan development process. Several possible changes to policies and strategies are suggested in Section 5 of this paper to address this idea. This option would provide local jurisdictions with an additional tool to coordinate land use and transportation plans, and to play an active role in reducing climate change impacts. Transportation benefit districts (TBD's) may be one means to fund transit expansion locally as part of a more comprehensive local transportation finance package, but legislative change would be needed to allow TBD revenues to be applied to operating costs on an ongoing basis.

Another approach could be to change legislation to allow for differential tax rates in different portions of the county. That approach would promote greater system integrity, but would require the legislature to raise the maximum transit tax rate, and the county to establish a mechanism to track how incremental revenues are applied to provide benefits in proportion to the tax rate in each part of the county.

Constraints to Growth

If even some of these issues and trends result in increased demand and revenue for transit, Metro will face welcome but difficult challenges to growing service quickly. There are practical constraints on how quickly new transit service can be added, and on the total amount of transit service growth that is possible. Some of these include:

- **Base capacity.** The most significant capacity constraint is for operating bases. While small increments of base capacity can be added up to a point and it is possible to operate bases over their capacity for a short time (at a reduced level of service and higher cost), Metro will need to expand its base capacity if service needs surpass those projected in the current financial plan. Metro calculates that new operating and maintenance base capacity will be needed in the 2015-2020 timeframe under current financial assumptions. If additional capacity is needed, Sound Transit may need to provide its own base facilities, Metro may need to site, design, fund and construct an additional base, or both. Planning would need to begin soon in order for new base capacity to become available by 2016.
- **Growth in service hours.** Metro has found in the past that there is a practical limit to the rate that new service hours can be deployed. A key constraint is how fast new drivers can be hired and trained, which is in turn affected by the state of the employment market. There are other administrative limits as well: schedules need to be developed and printed, marketing materials devised, and often facilities need to be put in place. King County Metro has estimated that the maximum service growth is on the order of 100,000 new service hours per year based on experience delivering rapid service growth during the 1990's decade. By contrast, the current financial plan projects average annual growth of 60,000 annual hours per year over the coming decade - or about 2% growth in service hours per year.
- **Availability of fleet.** Fleet constraints are most significant if temporary service is needed, such as for freeway construction mitigation. If buses will not be used for their expected 12-year minimum life, it may be possible to extend the service life of existing fleet that would otherwise be retired. In that case the capital cost will be lower, but the cost and base capacity needed for maintenance will be higher. For that reason mitigation service will be most practical if the construction program is staged over several years, or if mitigation service will be maintained permanently once construction is completed.
- **Park and Ride Capacity.** With a few exceptions, the park and ride lots located along major freeway corridors and commuter rail lines are already approaching capacity and it is likely that additional park and ride spaces will be filled as soon as they are constructed. For mitigation service, it will be important to consider where new riders will park. While it may be possible to establish some temporary park and ride facilities, or to direct customers to

available parking capacity farther from commute corridors, care needs to be taken to ensure that these facilities have the potential to become permanent if demand continues after construction is done. To increase park and ride lot capacity for longer-term system expansion will require a renewed planning and coordination effort to determine the best mix of park-and-ride vs. neighborhood services, to clarify agency planning and funding roles, and to identify a feasible financing plan. Under current financial plan assumptions, there are few resources available to fund major capital expansion projects.

Strategic Plan Issues

Metro is organized and focused on delivery of the *Transit Now* program over the coming decade. If Metro is called on to play a larger role in the future, delivering more transit than projected, either the constraints to growth must be removed or a higher capacity transit mode will be needed, or both. Providing for increased transit infrastructure requires significant lead-time. Developing a new transit operating base can take several years, and expanding Metro's institutional capacity to develop new service will take careful planning, if it is possible. At the very least, policymakers and voters will need to understand what share of transportation needs can be addressed by Metro Transit, and what share will need to be provided some other way.

Specific strategic plan issues include:

- **How can Metro be prepared to expand to provide additional service if needed?** All of the emerging issues discussed in this paper suggest that transit service may need to expand faster than current plans will provide for. Key constraints on expansion include operating base capacity, terminal space in key locations, and limits on the rate that new service can be put on the street. Planning will be needed to overcome these constraints well before the service expansion is needed. A new strategy to "Plan for System Expansion" in Section 5 of this paper is intended to address this issue.

Metro's recommendation is to develop a strategy to plan for contingencies, to define the options and frame the policy choices that may face King County policymakers in the future if transit is called on to grow more quickly than anticipated today. If policymakers feel that Metro should be prepared for contingencies that could require more rapid service expansion than is currently planned, the first step needed is an assessment of potential capacity needs and limits, and alternative actions and investments that could satisfy them. The analysis is made more difficult by the overlapping responsibilities of Metro and Sound Transit, since Sound Transit's future investments are not known. At some point policymakers may need to make difficult choices whether to invest in capacity that may not be needed immediately, but that choice cannot be made before the planning is done to define the options and their costs and tradeoffs.

5. Potential Changes to Policies or Strategies

Several comprehensive and strategic plan issues have been raised in this paper, some of them overlapping. Following is a list of proposed policy and strategy changes in response to those issues. Underlying these strategies and policies are proposed revised goals and objectives, some of which are also related to topics raised in this paper. The recommendations focus on reducing transportation-related emissions, increasing efficiency of transit through service strategies and land use, promoting transportation demand management and system pricing, increasing use and ridership of transit, and creating mechanisms and opportunities to fund additional services.

PLEASE NOTE:

The following potential changes to policies and strategies are intended to promote discussion about how the strategic and comprehensive plans could respond to issues raised in this briefing paper. They are not a formal policy proposals, but feedback received will help shape the Executive's proposed amendments.

In the following text, **bold and blue** denotes proposed additions, and *red and italic* denotes proposed deletions.

Reduce emissions of transit operations

One direct approach Metro Transit can take to reduce carbon emissions is to reduce the impact of the services we offer. Metro contributes to carbon emissions through our operations, facilities and practices. These policy and strategy changes are intended to reduce the carbon impacts that are directly attributable to our activities.

- **Strengthen policy on environmental protection.** The comprehensive plan already includes policy language directing Metro to minimize detrimental effects on the environment. The following proposed policy is more specific, adding a focus on greenhouse gas emissions, and calling for promising technologies to be advanced through demonstration projects.

Policy 3.2.5: Environmental Protection **and Greenhouse Gas Reduction**

Support preservation of environmental quality *with services and capital investments resulting in fewer detrimental impacts on air and water quality, noise reduction and better regional mobility.* **and reduce the production of greenhouse gas emissions through the use of environmentally-friendly, renewable energy sources; clean and fuel-efficient technologies for vehicles and facilities, and delivery of effective, efficient services.**

- **New strategy to consider expansion and enhancement of the electric trolleybus system.** Metro operates a zero-emission fleet of electric trolley buses today. Expanding this system to routes currently using diesel buses would directly reduce carbon emissions from operations on high-volume services. This strategy also calls for exploring opportunities to upgrade existing electric trolley services.

Strategy XX: Assess feasibility to expand and enhance electric trolleybus service

By July 2010, the Transit Division will assess opportunities, constraints and costs to expand electric trolleybus operation, or other zero-emission technology, to additional high-volume routes. The assessment will compare the costs and benefits of electric trolleybuses against other state-of-the-art clean vehicle technologies, and consider whether and how existing trolleybus services can be enhanced by applying treatments similar to those under consideration for RapidRide routes, such as branding, stop consolidation and off-board fare collection.

Prepare for and encourage strategic transit system expansion

All of the emerging issues discussed in this paper suggest that Metro Transit may need to play a larger role in transportation than is possible under the existing financial plan. Since King County has levied the maximum transit sales tax provided by law, new revenues for expanded service will likely be provided through agreements and partnership with other funding entities. These strategies and policies are intended to create a basis to pursue opportunities to expand Metro Transit's role and capacity to address emerging issues.

- **Expand partnership policy language to pursue new and sustainable revenues for transit.** The existing policy guidance on partnerships is broad. This minor edit proposes that partnerships are also a means to expand service.

Policy 3.4.5: Partnerships

General Partnerships:

Maximize the **growth and** effectiveness of local public transportation *funds* by pursuing joint financing of service, capital development opportunities, and ridership incentive programs with other public agencies and with private interests.

Transit Now Partnerships:

The *Six-Year Transit Development Strategic Plan for Public Transportation* or successor plans will identify a portion of planned service hour expansion to be dedicated for service partnerships to leverage other public and private resources to make public transportation investments of mutual interest. Partnership agreements with public and/or private entities will specify the service improvements to be made as well as the partner contributions, which may take the form of direct financial investment or investments in transit speed and reliability that will improve transit costs and increase ridership. Service resources dedicated to partnership programs shall be distributed based solely on performance and participation criteria, without regard to their impact on other service allocation policies.

- **Revise partnership strategy** to clarify Metro's interest in pursuing new services funded by non-Metro-generated revenues. The existing partnership strategy addresses only the *Transit Now* partnership program and partnerships with employers and jurisdictions to provide incentives for public transportation use. The emerging issues discussed in this paper suggest that Metro should pursue other partnership opportunities as well.

This proposed language supports Metro's aggressive pursuit of opportunities to increase transit funding from other agencies to increase transit services that are consistent with the strategic plan. For example, if tolls are pursued on regional highways, transit ridership will increase, and Metro would pursue opportunities for toll-supported increases in transit service. If construction mitigation service is warranted, Metro would pursue state or regional funding for mitigation as part of major construction budgets.

Perhaps more significantly, under this strategy Metro Transit would encourage local jurisdictions or transportation benefit districts to develop revenues to meet a higher level of transit service than the county can provide when needed to meet levels of service called for in comprehensive plans. This strategy could provide a basis for achieving different service levels in different cities and subareas based on locally-defined needs.

The strategy recognizes that other agencies will require a measure of control over the use of revenues they provide, as well as recognition. However, it is important that the public transportation system provide a consistent customer experience, and that all service and capital elements fit logically together as a system. Therefore this strategy clarifies that new services should be consistent with the strategic plan, and should be perceived by the customer as a single integrated public transportation system.

Strategy S-9: Partnerships

Develop partnerships with local jurisdictions, employers and institutions to increase public transportation services and improve service effectiveness.

- *Transit Now* partnerships: Solicit and enter into partnership agreements with public or private entities to mutually fund new or improved transit services, where the partner contribution may be in the form of direct funding or investment that results in transit speed or reliability improvements. Dedicate a portion of new service hours for this purpose.
- Commute Partnerships: Enter into partnerships to improve public transportation use and reduce single-occupant commuting by developing and promoting alternate commute programs; and by managing parking and traffic to make public transportation options more attractive.
- **New Service Development: Actively support and encourage development of new and sustainable transit resources. Encourage local jurisdictions to generate transit revenues to meet enhanced service needs identified in comprehensive plans. Encourage regional and state agencies to play a greater role in transit financing, including through transportation pricing. King County will retain**

responsibility to ensure that services and facilities are consistent with this Strategic Plan; adhere to guidelines for quality, efficiency and effectiveness; and provide for a consistent and positive customer experience. Within those parameters, local funding providers will have substantial direction over the use of the resources they provide by agreement, and King County will accommodate partners' need for visible recognition for services and facilities they help provide.

- **Revise prioritization strategy to also address new potential revenues.** The current prioritization strategy does not address service beyond what is provided for in the current financial plan. The proposed edits below are intended to allow for new initiatives, and to prioritize between them if capacity or resources are constrained. Note that the details regarding the *Transit Now* program, taken directly from ordinance, would be moved into a separate exhibit, rather than incorporated in the strategy text.

Strategy IM-1: **Priorities for New Transit Service** *Transit Now Program*

King County Metro's priority is to implement the Transit Now program passed by voters in 2006, **described in Exhibit 1-1 and** shown in Exhibit 1-2, which includes service and capital support for **RapidRide BRT, High Ridership Routes, Service Partnerships, New Service for Developing Areas, Expanded paratransit service, and Expanded ridesharing and vanpool program.** [NOTE: Move the program detail out of the strategy language into a separate table].

King County Metro should pursue opportunities to develop new sustainable revenues for services that are consistent with this Strategic Plan. In the case of partnership funding, use of new revenues should be governed by agreement with funding partners, with advice and concurrence of the Regional Transit Committee and the King County Council. When proposed new services exceed Metro's expansion capacity, services that are consistent with the strategic plan, open to the general public, have the highest productivity and the greatest likelihood of being sustainable over time will have a higher priority.

- **Develop a new implementation strategy to develop contingency plans for system expansion.** This proposed strategy calls on Metro Transit to advance financial planning and project development for system elements that pose critical constraints to system expansion if service expansion is to occur more rapidly than assumed in the current financial plan. Section 4 of this paper discussed some of the limits and challenges to system expansion. Overcoming these limits would require acceleration of needs assessment and project development for some critical elements, such as operation base capacity.

Strategy XX: Plan for System Expansion

To be prepared for opportunities or contingencies that require rapid expansion of transit service, beyond what is provided for in adopted financial plans, King County Metro will develop contingency plans identifying the service, capital, institutional and financial constraints and requirements for system expansion. Contingency

planning should be advanced for facilities and resources that would become critical if a rapid expansion becomes possible or necessary due to changing needs or increased revenues devoted to transit.

Use every dollar most effectively

With limited resources for transit, increased demand and new roles for transit will require Metro to make the best use possible of existing resources. Additionally, the most unproductive transit service may be a net emitter of greenhouse gases. Improving transit's efficiency can be accomplished in many ways including among others:

- increasing ridership, especially on services that have capacity
- increasing productivity
- increasing transit priority to reduce cost and time in traffic.

Policies and strategies to improve efficiency will be addressed in the upcoming briefing paper on Guidelines and Measures.

Use variable tolling to manage transportation demand

Meeting climate change objectives will require more significant efforts to reduce driving, calling on drivers to think twice about the decision to drive, and to make fewer and shorter trips. Much of what Metro does provides alternative to auto use and helps to manage travel demand. Under guidance of existing policies and strategies, Metro actively works to promote alternative travel modes through efforts such as commute partnerships, vanpooling and ridesharing.

Use of variable tolls for highways is a direct means of influencing travel demand, while improving highway and transit system performance, transit ridership and, potentially, revenues for transit service. To this end, the following policy is proposed:

- **New policy supporting pricing**, and clarifying position that a portion of revenues should be reserved for transit.

Policy 3.1.6: Transportation System Pricing

King County supports transportation pricing to manage traffic demand and generate new transportation revenues that are tied directly to auto use. Implementation of any pricing system should be designed to maintain a speed and reliability advantage to transit and rideshare users, and to manage transportation demand, capacity and congestion for all transportation system users. A portion of transportation use fees should be dedicated to increasing transit service frequency and capacity to accommodate displaced traffic and maintain mobility for all system users.

Promote and serve compact, transit-supportive, pedestrian-friendly land uses

Transit can play an important role in promoting healthy communities by extending the range people can traverse on foot and by bicycle, and by rewarding communities that adapt land uses and urban design to create pedestrian-friendly, transit-supportive places. Transit use and efficiency also improves when potential riders can access transit and other local activities without driving.

Existing policy and strategy language exists directing King County to develop and promote transit oriented development. Note that other strategies addressing the relationship of land use and transit service will be addressed in the upcoming briefing paper on Guidelines and Measures.

- **Revise strategy on transit and land use.** Existing language also calls for Metro to enhance transit in response to transit-supportive policies and development patterns, but this strategy has been difficult to apply. The revised language is intended to reduce the expectation that transit service can be distributed as a reward on a case-by-case basis, and to instead propose that Metro service planning should focus on serving transit-supportive land uses. “Transit supportive housing and/or employment densities” referred to in this proposed strategy will be discussed further in the forthcoming briefing paper on guidelines and measures.

Strategy S-4: Transit Improvements and Land Use

Promote transit-efficient land use, greenhouse gas reduction and healthy communities by giving increased priority for new or expanded service to areas of urbanized King County *Identify areas of urban King County to become eligible for enhanced transit service when they meet the following criteria: when they achieve the following:*

- *By Meeting or exceeding transit-supportive housing and/or employment densities, prorated established housing and population targets, or*
- *By Encouraging higher density development and pedestrian activity through adopted* **Adopt** regulations and policies that promote mixed-uses, establish minimum densities, reduce parking requirements, and carry out other efforts that support compact, transit supportive development.
- *Preference will be given to areas that realize* **Realize** community or neighborhood development consistent with these criteria.

Provide transit service to mitigate large-scale freeway construction projects

- **Develop new strategy to mitigate freeway construction impacts.** As discussed in section III of this paper, transit can play an important role mitigating the impacts of major construction projects as long as several favorable conditions are met. Transit can benefit if riders attracted to mitigation service have a good experience and remain as riders once the construction is ended.

Strategy XX: Provide transit service to mitigate freeway construction delay

Provide transit service to mitigate the effects of major freeway construction projects when resources are available that are not required for ongoing service needs, and when transit service will provide a competitive and reliable travel time compared to projected auto delays during construction. Work with other agencies to identify transit requirements well in advance of construction, to identify a transit pathway through or around construction, and to coordinate construction schedules to maximize transit effectiveness while minimizing cost and resource needs.

Bibliography

1. Bailey, Linda, "Public Transportation and Petroleum Savings in the U.S.: Reducing Dependence on Oil", ICF International, January 2007.
http://www.apta.com/research/info/online/documents/apta_public_transportation_fuel_savings_final_010807.pdf
2. Climate Impacts Group at the University of Washington and King County, "Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments", September 2007. <http://www.cses.washington.edu/db/pdf/snoveretalgb574.pdf>
3. Davis, Todd and Monica Hale, "Public Transportation's Contribution to U.S. Greenhouse Gas Reduction", SAIC, September 2007.
http://www.apta.com/research/info/online/climate_change.cfm
4. Energy Information Administration (EIA) Residential Transportation Energy Consumption Survey 1994. <http://www.eia.doe.gov/emeu/rtecs/contents.html>
5. Evans, John E.; Bhatt, Kiran U.; Turnbull, Katherine F. "Road Value Pricing: Traveler Response to Transportation System Changes" Transit Cooperative Research Program Report 95, Chapter 14. Transportation Research Board, 2003.
6. Ewing, Reid, Keith Bartholomew, Steve Winkelman, Jerry Walters, and Don Chen, "Growing Cooler: The Evidence on Urban Development and Climate Change", Urban Land Institute and other organizations, October 2007.
<http://sgusa.convio.net/site/DocServer/GrowingCooler9-18-07small.pdf?docID=4061>
7. King County, "Climate Plan", 2007.
<http://www.metrokc.gov/exec/news/2007/pdf/ClimatePlan.pdf>
8. King County, "Draft Energy Plan", 2007.
<http://www.metrokc.gov/exec/news/2007/pdf/EnergyPlan.pdf>
9. Lawrence Frank & Co. "LUTAQH: A Study of Land Use, Transportation, Air Quality and Health in King County, WA", December 2005.
http://www.metrokc.gov/healthscape/publications/LUTAQH_brochure.pdf
10. PEW Center on Global Climate Change, "Climate Change 101: Understanding and Responding to Global Climate Change", 2006.
http://www.pewclimate.org/docUploads/1114_OverviewFinal.pdf
11. "Transit and VMT Reduction" Travelmatters.org. <http://www.travelmatters.org/about/transit-vmt>

12. Transportation Research Board “Making Transit Work: Insight from Western Europe, Canada and the United States”, Special Report 257. Committee for an International Comparison of National Policies and Expectations Affecting Public Transit. National Research Council. 2001. http://www.trb.org/news/blurbs_detail.asp?id=2666
13. Victoria Transport Policy Institute TDM Encyclopedia “Road Pricing: Congestion Pricing, Value Pricing, Toll Roads and HOT Lanes”. <http://www.vtpi.org/tdm/tdm35.htm>
14. Washington Climate Advisory Team, “Leading the Way on Climate Change: A Comprehensive Approach to Reducing Greenhouse Gases in Washington State” January 2008. http://www.ecy.wa.gov/climatechange/InterimReport/climate_08-B-CAT.pdf
15. Winkelman, Steve, “Transportation Climate Package: Modeling Approach and Discussion Questions”, Center for Clean Air Policy memo, July 2007. http://www.ccap.org/domestic/Domestic%20Dialogue%20July%202007%20Presentations/CCAP%20Transp%20package%20discussion%20memo%20_7%2026%2007_.pdf